

WHAT IS CLAIMED IS:

1. An apparatus for generating a plurality of effluents comprising:
 - a) a multiplicity of vessels containing solids, each vessel having an inlet and an outlet;
 - 5 b) at least one sampling valve in fluid communication with the outlets of the vessels;
 - c) a set of effluent conduits in fluid communication with the sampling valve, the number of effluent conduits at least equal to the number of vessels;
 - 10 d) a set of bypass conduits in fluid communication with the sampling valve, the number of bypass conduits at least equal to the number of vessels;
 - e) a set of vent conduits in fluid communication with the sampling valve;
 - 15 f) at least one selector valve in fluid communication with the set of effluent conduits and the set of bypass conduits; and
 - g) a processing device in fluid communication with the selector valve.
2. The apparatus of Claim 1 wherein the processing device is selected from the group consisting of a detector, a reactor, and a treatment vessel.
- 20 3. The apparatus of Claim 1 wherein said vessels are grouped into banks of vessels wherein each bank of vessels is associated with an independent set of elements (b) through (g) of Claim 1.
4. The apparatus of Claim 1 wherein the multiplicity of vessels is comprised of at least six vessels.
- 25 5. The apparatus of Claim 1 wherein the multiplicity of vessels is comprised of at least twelve vessels.
6. The apparatus of Claim 1 further comprising a venting conduit in fluid communication with the selector valve.

5 7. The apparatus of Claim 2 wherein the detector is selected from the group consisting of a gas chromatograph, an infrared detector, a uv-vis detector, an ultraviolet detector, a visible detector, fluorescence detector, an infrared thermography detector, a nuclear magnetic resonance detector, a paramagnetic resonance detector, a X-ray adsorption detector, a X-ray photoelectron detector, a Raman detector and combinations thereof.

10 8. The apparatus of Claim 1 further comprising a set of feed conduits in fluid communication with a set of feed selector valves, each feed selector valve in fluid communication with two or more vessels.

15 9. The apparatus of Claim 8 further comprising a main selected feed conduit in fluid communication with each feed selector valve, said main selected feed conduit branched into a set of selected feed conduits each equipped with a mass flow controller and a pressure transducer, each said selected feed conduit in fluid communication with one vessel.

20 10. The apparatus of Claim 9 further comprising a pressure transducer in fluid communication with the main selected feed conduit.

25 11. The apparatus of Claim 8 further comprising a saturator in fluid communication with at least one feed conduit.

12. The apparatus of Claim 11 wherein the saturator is associated with a heater or a cooler.

13. The apparatus of Claim 1 wherein the vessels are comprised of a bottom well, a top cover, and an insert.

14. The apparatus of Claim 1 further comprising a heater located proximate to the vessels.

15. The apparatus of Claim 1 further comprising a temperature control system for regulating the temperature of the vessels.

16. The apparatus of Claim 1 wherein the number of bypass conduits equals the number of effluent conduits.

17. A method of generating a plurality of effluents comprising simultaneously contacting a plurality of solids with a feed fluid to generate a plurality of effluents and simultaneously sampling and then processing the effluents.

18. The method of Claim 17 wherein the processing comprises analyzing the effluents and determining changes in the effluents as compared to the feed fluid.

5 19. The method of Claim 18 wherein the changes determined include changes in composition of the effluents as compared to the feed fluid.

10 20. The method of Claim 17 wherein the processing comprises further treating the effluents.

21. The method of Claim 17 wherein the sampling comprises flowing the effluents through a sampling system in order to trap a portion of the effluents in a plurality of effluent conduits and sequentially processing the effluents.

15 22. The method of Claim 17 further comprising weighing each of the solids prior to contacting with the feed fluid.

23. The method of Claim 17 further comprising passing a gaseous stream through a body of liquid to form the feed fluid prior to contacting with the solids.

20 24. The method of Claim 23 further comprising analyzing the feed fluid formed by passing a gas stream through a body of liquid to determine the composition of the feed fluid.